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I, JULIE BILLINGSLEY, TEAM LEADER EXAMINATION SUPPORT AND SALES hereby certify that annexed is a true copy of the Provisional specification in connection with Application No. 2002951977 for a patent by LEO ENGINEERING PTY LTD and WELLINGTON INDUSTRIES PTY LTD as filed on 10 October 2002.



WITNESS my hand this
Twenty-second day of October 2003

J. Billingsley

**JULIE BILLINGSLEY
TEAM LEADER EXAMINATION
SUPPORT AND SALES**

AUSTRALIA
Patents Act 1990

PROVISIONAL SPECIFICATION

Applicants:

LEO ENGINEERING PTY LTD

WELLINGTON INDUSTRIES PTY LTD

Invention Title:

IMPROVEMENTS TO TWO-PART VESSELS

The invention is described in the following statement:

IMPROVEMENTS TO TWO-PART VESSEL

Field of the Invention

5 The present invention relates to vessels having two compartments. Such vessels can be used in all manner of domestic, medical and industrial applications where the initiation of mixing of two substances needs to be controlled, and will primarily be described with reference to this context.

10

Background Art

Many different types of containers are known in the prior art which enable the separation of two components of a mixture until use of the mixture is required. In 15 containers where two or more products are supplied pre-mixed, the potency of the mixture may reduce rapidly with time. For example, mixtures such as medicines and antidotes have a limited shelf life after the active ingredients are mixed.

20 Some of the prior art containers have a membrane fitted into the interior of a lid of the container, the membrane made of tinfoil or thin plastic for example, which can be perforated by application of external pressure to an upper surface of the lid in order to actuate movement of a 25 depressible tab or knife edge located in the lid. These containers are generally of complex construction which can make them costly to manufacture.

Summary of the Invention

30 The present invention provides a device for location at an opening to a receptacle including:

- a projection adapted for association with the receptacle at or near the opening;
- a lid for location at the opening including a 35 compartment that is positionable at or near the

opening when the lid is located there; and
- engagement means associated with the lid;
wherein when the compartment is positioned at or near
the opening and the lid is moved in a given direction
relative to the receptacle, the engagement means is
caused to act on the projection such that it opens the
compartment to fluid communication with the
receptacle.

By associating the projection with the receptacle, the
lid including the compartment can be of simpler
construction than those known in the art for this purpose.

Preferably the projection is hingedly moveable into a
position to open the compartment.

Preferably the compartment is closeable in use with an
openable seal.

Preferably the projection least partially detaches the
seal from the compartment.

Preferably the projection includes a cutter portion
adapted for cutting the seal.

Preferably the engagement means is a protrusion
located internally of the lid and externally of the
compartment. More preferably the protrusion is one or more
flanges located on an external wall of the compartment and
arranged to bias the projection into a location that opens
the compartment as the lid is moved in the given direction.
Most preferably the flanges are a series of ribs arranged
around the perimeter of the compartment and projecting
outwardly from the compartment external wall.

Preferably the lid is rotatable relative to the
receptacle. Preferably the lid is attached to the
receptacle via rotation in a first direction and is
detached via rotation in a second opposite direction, the
second direction corresponding to said given direction.

Preferably the lid is adapted for threadable
engagement with the receptacle.

Preferably the compartment is also adapted for access

from another location other than via the seal. Preferably the access adaptation is a closeable orifice in an exterior surface of the lid. Most preferably a removeable or insertable disc is arrangable for engagement with a rim of the orifice in a closed position.

Alternatively the access adaptation is a closeable projecting teat located at an exterior surface of the lid.

Preferably the projection is integral with the receptacle at the opening or part of an insert locatable in the receptacle opening. In the latter instance preferably the insert is a sleeve positionable in a neck of the receptacle and the projection protrudes inwardly of the sleeve.

Preferably the lid is provided with a tamper-evident seal. Most preferably the seal is a strip detachably positioned at an edge rim of the lid which adjoins the receptacle in use.

In a second aspect the present invention provides a lid for location at the opening of a receptacle, the lid including a compartment that is positionable at or near the opening when the lid is located thereat, wherein the compartment is adapted for access from both within the receptacle and from outside the lid.

Preferably the lid of the second aspect is as defined in the first aspect.

In a third aspect the present invention provides a lid for location at an opening as defined in either the first or the second aspect.

In a fourth aspect the present invention provides a receptacle being fitted with a device as defined in the first aspect.

In a fifth aspect the present invention provides a sleeve which is insertable into an opening of a receptacle and having a projection as defined in the first aspect.

In a sixth aspect the present invention provides a method of opening a compartment located in a lid so that

the compartment is brought into fluid communication with a receptacle including the step of moving the lid in a given direction relative to the receptacle at or near an opening of the receptacle so that a projection associated with the
5 receptacle opens the compartment.

In a seventh aspect the present invention provides a method of opening a compartment located in a lid so that the compartment is brought into fluid communication with a receptacle when the lid is placed at or near an opening of
10 the receptacle wherein movement of the lid in a rotational manner causes access to the compartment.

Brief Description of the Drawings

Notwithstanding any other forms which may fall within
15 the scope of the present invention, preferred forms of the invention will now be described, by way of example only, with reference to the accompanying drawings in which:

Figure 1 shows a perspective view of one embodiment of a lid in accordance with the invention.

20 Figure 2 shows a side elevational view of the lid shown in Figure 1.

Figure 3 shows a cross-sectional view of the lid of Figure 1.

Figure 4 shows a plan view of the lid of Figure 1.

25 Figure 5 shows a perspective view of one embodiment of a sleeve which is insertable into the opening of a receptacle and having a projection fitted thereto in accordance with the invention.

30 Figure 6 shows a side elevational view of the sleeve shown in Figure 5.

Figure 7 shows a plan view of the sleeve shown in Figure 5.

35 Figure 7A shows a detailed plan view of a portion of the sleeve shown in Figure 6, the portion having the projection fitted thereto.

Figure 8 shows a perspective sectional view of the lid

of Figure 1 when fitted in use to the sleeve of Figure 5.

Figure 9 shows a further perspective sectional view of the lid and sleeve of Figure 8.

Figure 10 shows a further perspective sectional view of the lid and sleeve of Figure 8 showing how the projection is positioned in relation to the lid.

Figure 11 shows a cross-sectional view of the lid and sleeve of Figure 8.

Figure 12 shows a perspective exploded sectional view of a further embodiment of a lid when fitted in use to the sleeve of Figure 5 in accordance with the invention.

Figure 13 shows a side elevational view of the embodiments of the lid and sleeve shown in Figure 12.

Figure 14 shows a perspective view of the embodiments of the lid and sleeve of Figure 13.

Figure 15 shows a perspective exploded sectional view of a further embodiment of a lid when fitted in use to the sleeve of Figure 5 in accordance with the invention.

Figure 16 shows a perspective view of the embodiments of the lid and sleeve of Figure 15.

Figure 17 shows a further perspective view of the embodiments of the lid and sleeve of Figure 15.

Modes for Carrying out the Invention

Referring to the drawings, a device 10 is shown for location at an opening to a receptacle such as a bottle or other storage container. The device 10 includes a lid 12 for location at the opening. The lid has a circular top plate 14 and a skirt 16 depending therefrom, the exterior surface of the skirt 16 having longitudinal ribs or grooves 18 to facilitate finger grip by a user. The interior of the lid 12 includes a centrally-located circular compartment 20 that is positionable at the opening when the lid 12 is located thereat. Typically the compartment is closed by an openable seal such as a foil or plastic

membrane which is affixed to the lowermost rim 22 of the compartment 20 by an appropriate sealant, such as an adhesive, or as a result of a welding process (ie. conductively or inductively welded).

5 In use the compartment 20 contains a substance which is designated for mixing with the fluid which is in the bottle or container. The seal maintains a barrier to fluid communication between the substance and the fluid in the bottle or container until such time as the device is
10 actuated and the seal is broken as will now be described.

 The device 10 also includes engagement means in the form of a series of longitudinal ribs 24 arranged around the perimeter of the compartment 20 in the lid 12 and projecting outwardly from the compartment 20 external wall
15 26. In further embodiments at least one rib 24 or other protrusion of some kind is required on the external wall 26. The device 10 also includes a projection in the form of a support flange 28 joined via a thin section hinge 30 to a hingedly moveable cutter 32 and associated deflection
20 arm 34. In the preferred embodiment the support flange 28, moveable cutter 32 and deflection arm 34 are positioned on and are integral with the interior surface 36 of a circular cross-sectional sleeve 38 which is inserted into the bottle or container opening. In other embodiments the support
25 flange 28, moveable cutter 32 and deflection arm 34 can be arranged to be integrally formed at the interior surface of the opening of the bottle or container. In still other embodiments there can be more than one projection including the flange 28, cutter 32 and arm 34 located at the bottle
30 or sleeve interior surface. When assembled, there is at least a small clearance distance between the interior surface of the bottle or container (or of the interior surface 36 of the sleeve 38) and the longitudinal ribs 24.

 The rib/s 24 on the compartment 20 external wall 26
35 are arranged in use to bias the cutter 32 into a position that opens the sealed compartment 20. In the preferred

embodiment, and as best shown in Figures 10 and 11, as the lid 12 is moved in a given direction G, the upwardly projecting deflection arm 34 is moved into contact with a longitudinal rib 24. As rotation of the lid 12 continues, the deflection arm 34 is hingedly moved upward in the direction of arrow Z (Figure 11). This movement causes a likewise hingedly upward deployment of the associated cutter 32. The cutter 32 moves into contact with the openable seal and breaks the seal. As the lid 12 is further rotated in the given direction G, the stationary cutter 32 is moved to further break or cut the seal at or near the lowermost edge rim 22 of the compartment 20. At some point sufficient of the seal is cut, torn or detached to allow a substance held in the compartment 20 to pass into adjoining the bottle or container, so that mixing can commence.

In further embodiments the projection can include parts other than a cutter, for example a piercing element such as a spike which can break the openable seal and allows a gaseous, liquid or powdered substance to flow from the compartment 20 into the adjoining bottle or container. The actuation of the projection can be by engagement ribs of different shapes or configurations on the lid. In still further embodiments, the deflection of the cutter 32 can occur by other than a hinging action, for example the engagement means can act on a trigger release associated with the projection to move at least a portion of the projection so as to open the seal.

When the lid 12 is attached to the opening of the bottle or container it is initially located thereon by rotation in a direction G' which is opposite to the aforementioned given direction G for detaching the lid 12 which also causes an opening of the seal. Because of the angled orientation of the deflection arm 34, when the lid 12 is moved in the direction G' it is not caused to deflect upwardly. The movement of the deflection arm 34 past the

lowermost portions of the engagement ribs 24 in the direction G' is facilitated by a slight rounding of the lowermost leading edge 40 of those ribs 24 and by a slight rounding of the uppermost trailing edge 41 of the deflection arm 34, as shown in Figure 11. Typically the lid 12 is adapted for threadable engagement with mating thread recesses located near the exterior portion of the neck or mouth of the bottle or container. The lid 12 has threaded coupling protrusions 42 shown in the Figures. In further embodiments the lid need not be attached to the bottle or container by a threadable coupling, but can simply be a 'bump on' lid which is snapped on, but which can still rotate to cause opening of the compartment in direction G.

In further embodiments shown in Figures 12 to 17, the compartment 20 in the lid 50 can have a second opening to allow access thereto, other than via the seal at the lowermost edge rim 22. Figures 12 to 14 show one such embodiment where like parts shown in previous embodiments have like numbers. In this embodiment, the lid 50 provides access to the compartment 20 via a closeable orifice 48 in the circular top plate 14 of the lid 50. As shown in Figure 12 a removeable or insertable disc 44 is arranged for engagement with a rim 46 of the orifice 48 when located in a closed position. The compartment 20 can thus be accessed from both within the bottle or container to which the lid 50 is attached, and from outside the lid 50. In further embodiments the disc can be hinged to the rim 46 of the orifice 48 by, for example, a plastic hinge, so that it is not entirely removeable but simply insertable in the orifice 48.

Such an embodiment is useful if a lid manufacturer wishes to provide a lid 50 already fitted with an openable seal in the form of a foil or plastic membrane. Thus the purchaser of lids (for example the actual bottler/supplier of drinks or medicines etc) can insert the desired

substance into the lid 50 compartment 20 via orifice 48 and
replace/insert the disc 44 without needing to themselves go
to the expense of developing, say, a foil membrane
applicator or process for use once the substance has been
5 placed in the compartment 20. Likewise once the lid 50
itself has been rotated in direction G to actuate the
deployment of the cutter 32, and the mixing of the
substance in the compartment with the fluid in the bottle
has been accomplished, a user of the combined fluid and
10 substance need only restore the lid 50 to its tightened
position by rotation in the direction G' and then remove or
hingedly open the lid disc 44 in order to be able to access
the mixture via the narrower opening in the form of orifice
48. The orifice 48 may be more useful to drink or dispense
15 liquid out of in some situations, for example while the
user is in motion and spillage is preferably minimised.

In a further embodiment, as shown in Figures 15 to 17
the lid 54 of the device can include the feature of a
closeable projecting teat in the form of a drink-through
20 spout 56 similar to that known in water and sports-type
drink bottles. Typically the spout 56 is positioned over
the orifice 48 in the lid 54 (in the location where the lid
disc 44 went in the embodiment shown in Figure 12 to 14).
The closeable teat also includes a retractable drink-
25 through cap 58 which is fitted over the spout 56 and is
slidably moveable in relation to the spout 56 from a closed
position where the cap 58 is in close contact with the
spout 56 (so as to prevent the flow of liquid from the
compartment 20 via the discharge hole 60 in the spout 56)
30 to an open position where the cap 58 is moved away from the
spout 56 (so as to allow flow of liquid from the
compartment 20 via the discharge hole 60 and through the
corresponding hole 62 in the cap 58). In use the cap 58
can be pulled upwardly into an 'open' position so that
35 fluid (or fluid-solid mixtures etc) can be dispensed from
the bottle or container. Closure of the spout 56 can be

effected by depressing the cap 58. Prior to drinking the contents of the receptacle, the rotation of the cap 54 thereon can initiate the movement of the cutter 32 to break the seal on the compartment 20 and to release the substance from the compartment 20, as already described.

In any of the previously described embodiments the lid 12, 50, 54 can be fitted with a tamper-evident seal. Referring to Figure 12 to 17, the seal is shown in the form of a strip 66 which is formed as a portion of the lid 50, 54 and which is joined to the lowermost edge rim 64 of the lid 50, 54 by a line of weakness (eg a series of perforations or a thin section of lid material). In use when the lid 54 is fitted to a receptacle in the form of a bottle or container, the strip 66 is in contact with the exterior surface of the bottle or container. Figures 14 and 17 most clearly show the innermost circumferential face of the strip 66 as having a series of projecting teeth 68 or serrations which initially are in contact with the bottle or container. In use, when the lid 50, 54 is rotated to cut the seal at the lowermost edge rim 22 of the compartment 20, the tamper evident strip 66 is also physically torn off the rim 64 of the lid 50, 54, a process assisted by the grip of the teeth 68 of the strip 66 onto the bottle or container surface. The relative movement of the lid 54, and the resistance to movement of the strip 66 because of the teeth, causes the tearing of the strip 66 from the lid 54. In other embodiments the strip may be laterally expanded during the rotational movement of the lid and the strip need not be completely torn from the lid.

Such a tamper-evident strip provides a visual indication to a potential user of the bottle or container that the lid 12, 50, 54 has already been at least partially rotated, and, as such, it is likely that the seal at the lowermost rim 22 of the compartment 20 has also been perforated or torn by that rotational movement. Thus the efficacy of the substance held in the compartment 20 may

have been compromised. Without an external tamper-evident strip, if the bottle or receptacle is not at least partially transparent, it may not be possible for a user to determine if the seal at the compartment 20 has already
5 been compromised.

These embodiments of the device 10 can be used in many different applications. It is envisaged that the device 10 can find uses as diverse as pharmaceutical and drug dispensing, 'sports' type and vitamin supplement drinks and
10 alcoholic and non-alcohol mixer drinks. The device can also be applied to the introduction of any chemicals into a process liquid, for example a process where a concentrate of some kind is required to be introduced into water or a base carrier, for example colouring and tinting (in
15 hairdressing or graphic arts printing). In a further example, an industrial type application can be in the mixing of resins, glues and epoxy compounds, or other two-part products. The substance being dispensed from the compartment can be a liquid for example an ink or an
20 emulsion, or solid materials such as powders or ground material, tablets, granules, chopped leaves or plant matter etc. The substance can be maintained in a sterile environment once it is sealed in the airtight and watertight compartment. The efficacy of many products is
25 enhanced when mixed or combined directly prior to their use or consumption.

The operation of the device is intuitive, simply requiring the cap to be unscrewed from the receptacle (or in some cases merely turned in relation to the receptacle)
30 in order to effect dispensation of the substance from the compartment. Because of its simplicity, the tooling costs for manufacturing such a device are minimised. In many of the prior art devices, the tooling costs are expensive because the devices have too many components that require
35 assembly, and by their shape and configuration limit the type of substances that can be dispensed.

The device 10 may be of any particular shape, suitable for use in receptacle mouths of different shapes, for example round, oval, square etc as the situation demands. In further embodiments the compartment can be of any
5 suitable shape that fits into the mouth of the receptacle, for example a circular, square or rectangular cylinder, and made of lightweight plastic, foil metal or other material which can be used to form a stable bladder or chamber that separates a substance from the fluid in the receptacle.

10 The materials of construction of the lid and the engagement means, the sleeve (if there is one) and the projection can comprise any suitable materials which can be shaped, formed and fitted in the manner so described, such as metal or hard plastics which can be injection moulded to
15 give a structurally sound device.

The embodiments of the invention shown can provide an improved two part vessel which can keep the contents of a compartment separated from the contents of the main portion of the vessel until mixing is required. By having the
20 projection for opening the compartment associated with the receptacle (or a sleeve positioned in the mouth of the receptacle), the lid including the compartment can be of simpler construction than those known in the art for this purpose.

25 It is to be understood that, if any prior art information is referred to herein, such reference does not constitute an admission that the information forms a part of the common general knowledge in the art, in Australia or any other country.

30 Whilst the invention has been described with reference to a number of preferred embodiments it should be appreciated that the invention can be embodied in many other forms. For example, the support for the creature may simply be in the form of a perch.

CLAIMS

1. A device for location at an opening to a receptacle including:
 - 5 - a projection adapted for association with the receptacle at or near the opening;
 - a lid for location at the opening including a compartment that is positionable at or near the opening when the lid is located thereat; and
 - 10 - engagement means associated with the lid;
 wherein when the compartment is positioned at or near the opening and the lid is moved in a given direction relative to the receptacle, the engagement means is caused to act on the projection such that it opens the
 - 15 compartment to fluid communication with the receptacle.
2. A device as claimed in claim 1 wherein the projection is hingedly moveable into a position to open the compartment.
- 20 3. A device as claimed in claim 1 or claim 2 wherein the compartment is closeable in use with an openable seal.
4. A device as claimed in claim 3 wherein the projection least partially detaches the seal from the compartment.
5. A device as claimed in claim 4 wherein the projection
- 25 includes a cutter portion adapted for cutting the seal.
6. A device as claimed in any one of the preceding claims wherein the engagement means is a protrusion located internally of the lid and externally of the compartment.
7. A device as claimed in claim 6 wherein the protrusion is
- 30 one or more flanges located on an external wall of the compartment and arranged to bias the projection into a location that opens the compartment as the lid is moved in the given direction.
8. A device as claimed in claim 7 wherein the flanges are a
- 35 series of ribs arranged around the perimeter of the

compartment and projecting outwardly from the compartment external wall.

9. A device as claimed in any one of the preceding claims wherein the lid is rotatable relative to the receptacle.

5 10. A device as claimed in claim 9 wherein the lid is attached to the receptacle via rotation in a first direction and is detached via rotation in a second opposite direction, the second direction corresponding to said given direction.

10 11. A device as claimed in claim 9 or claim 10 wherein the lid is adapted for threadable engagement with the receptacle.

12. A device as claimed in any one of claims 3 to 5 wherein the compartment is also adapted for access from another
15 location other than via the seal.

13. A device as claimed in claim 12 wherein the access adaptation is a closeable orifice in an exterior surface of the lid.

14. A device as claimed in claim 13 wherein a removeable or
20 insertable disc is arrangable for engagement with a rim of the orifice in a closed position.

15. A device as claimed in claim 12 wherein the access adaptation is a closeable projecting teat located at an exterior surface of the lid.

25 16. A device as claimed in any one of the preceding claims wherein the projection is integral with the receptacle at the opening or part of an insert locatable in the receptacle opening.

17. A device as claimed in claim 16 wherein the insert is a
30 sleeve positionable in a neck of the receptacle and the projection protrudes inwardly of the sleeve.

18. A device as claimed in any one of the preceding claims wherein the lid is provided with a tamper-evident seal.

35 19. A device as claimed in claim 18 wherein the seal is a strip detachably positioned at an edge rim of the lid which adjoins the receptacle in use.

20. A lid for location at the opening of a receptacle, the lid including a compartment that is positionable at or near the opening when the lid is located thereat, wherein the compartment is adapted for access from both within the receptacle and from outside the lid.
21. A lid as claimed in claim 20 wherein the lid is as defined in any one of claims 1 to 19.
22. A lid for location at an opening as defined in any one of claims 1 to 21.
23. A receptacle being fitted with a device as defined in any one of claims 1 to 19.
24. A sleeve which is insertable into an opening of a receptacle and having a projection as defined in any one of claims 1 to 19.
25. A method of opening a compartment located in a lid so that the compartment is brought into fluid communication with a receptacle including the step of moving the lid in a given direction relative to the receptacle at or near an opening of the receptacle so that a projection associated with the receptacle opens the compartment.
26. A method of opening a compartment located in a lid so that the compartment is brought into fluid communication with a receptacle when the lid is placed at or near an opening of the receptacle wherein movement of the lid in a rotational manner causes access to the compartment.
27. A method as claimed in claim 25 or claim 26 that uses a device as defined in any one of claims 1 to 24.
28. A device substantially as herein described with reference to the accompanying drawings.
29. A lid substantially as herein described with reference to the accompanying drawings.
30. A receptacle substantially as herein described with reference to the accompanying drawings.
31. A sleeve substantially as herein described with reference to the accompanying drawings.
32. A method substantially as herein described with

reference to the accompanying drawings.

Dated this 10th day of October 2002

LEO ENGINEERING PTY LTD

and

WELLINGTON INDUSTRIES PTY LTD

by its Patent Attorneys

GRIFFITH HACK

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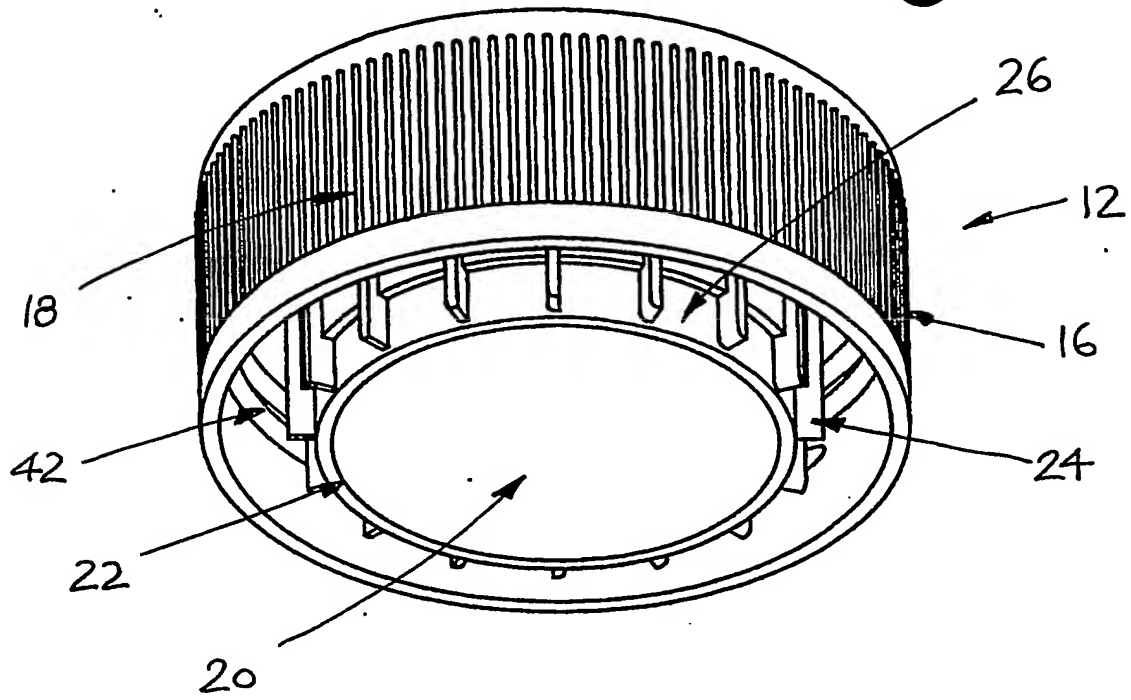


FIG. 1

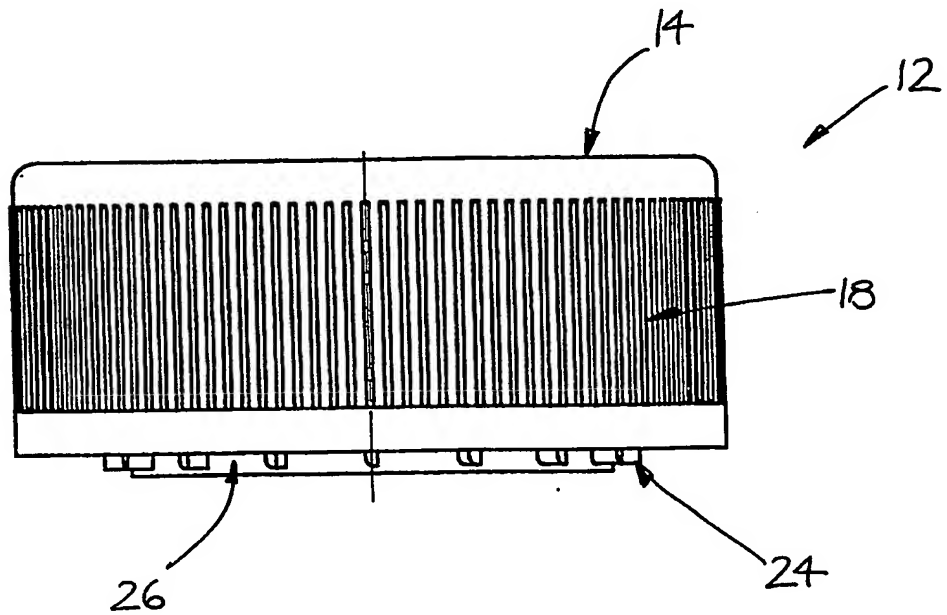


FIG. 2

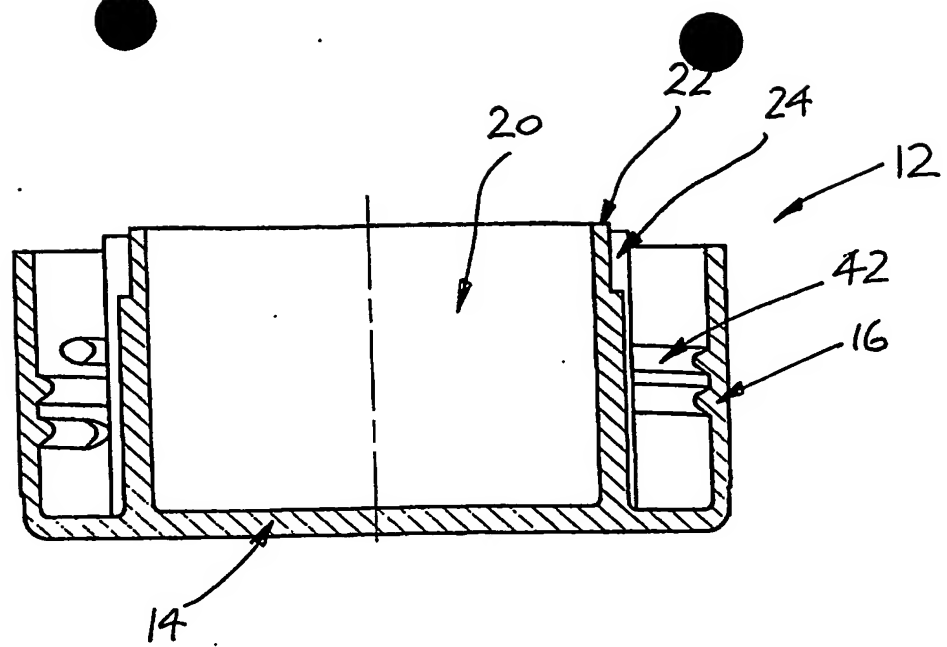


FIG. 3

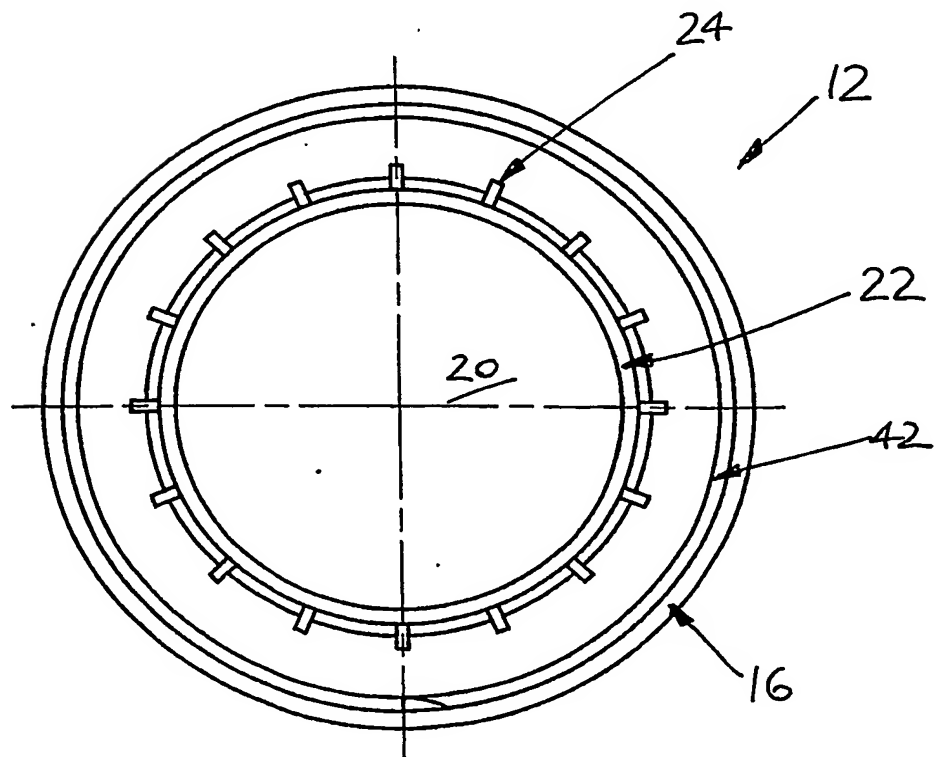


FIG. 4

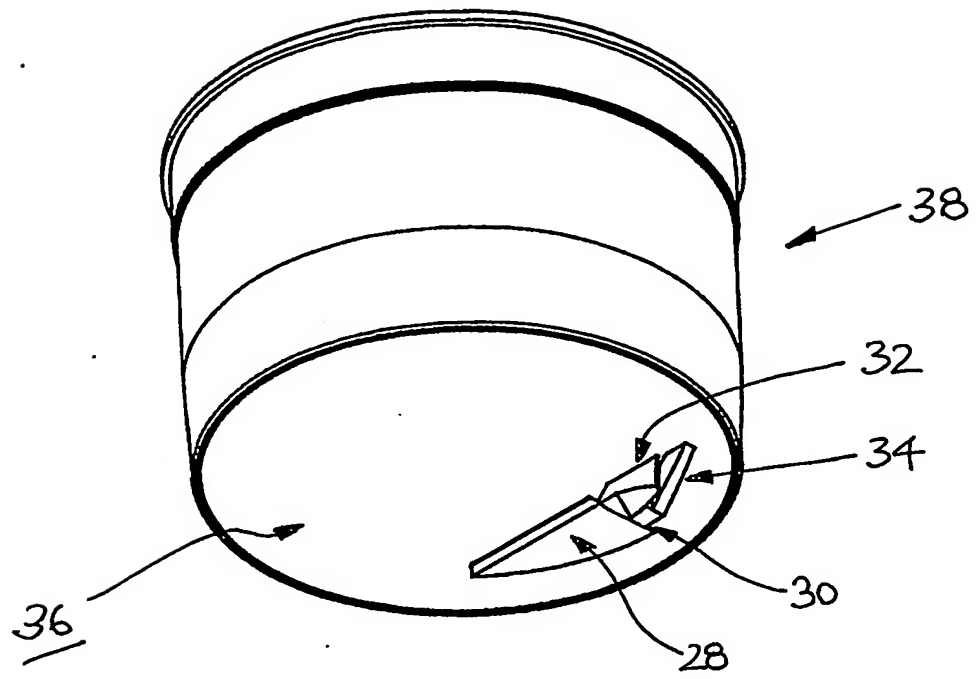


FIG. 5

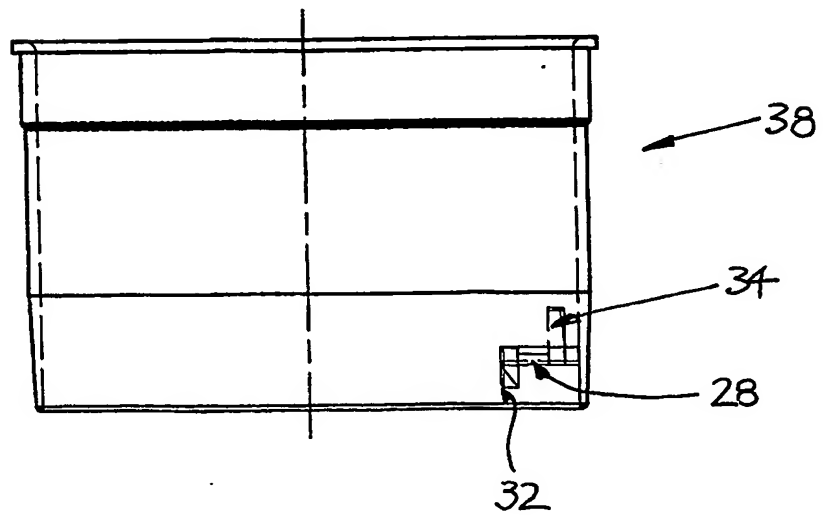


FIG. 6

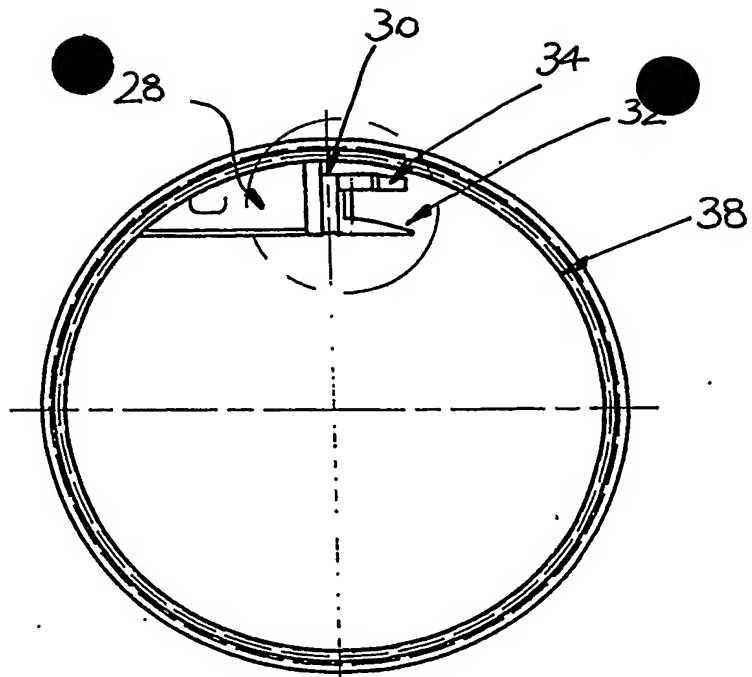


FIG. 7

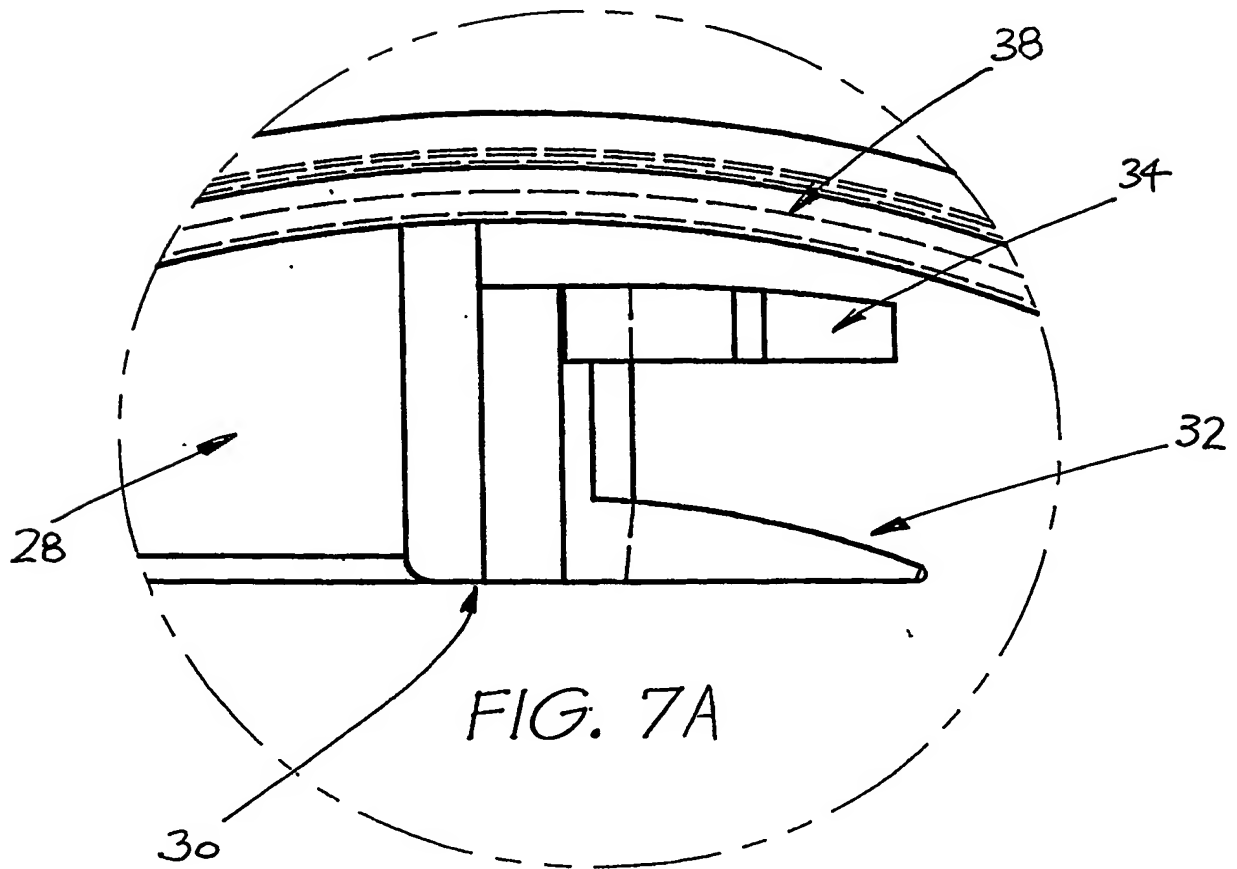


FIG. 7A

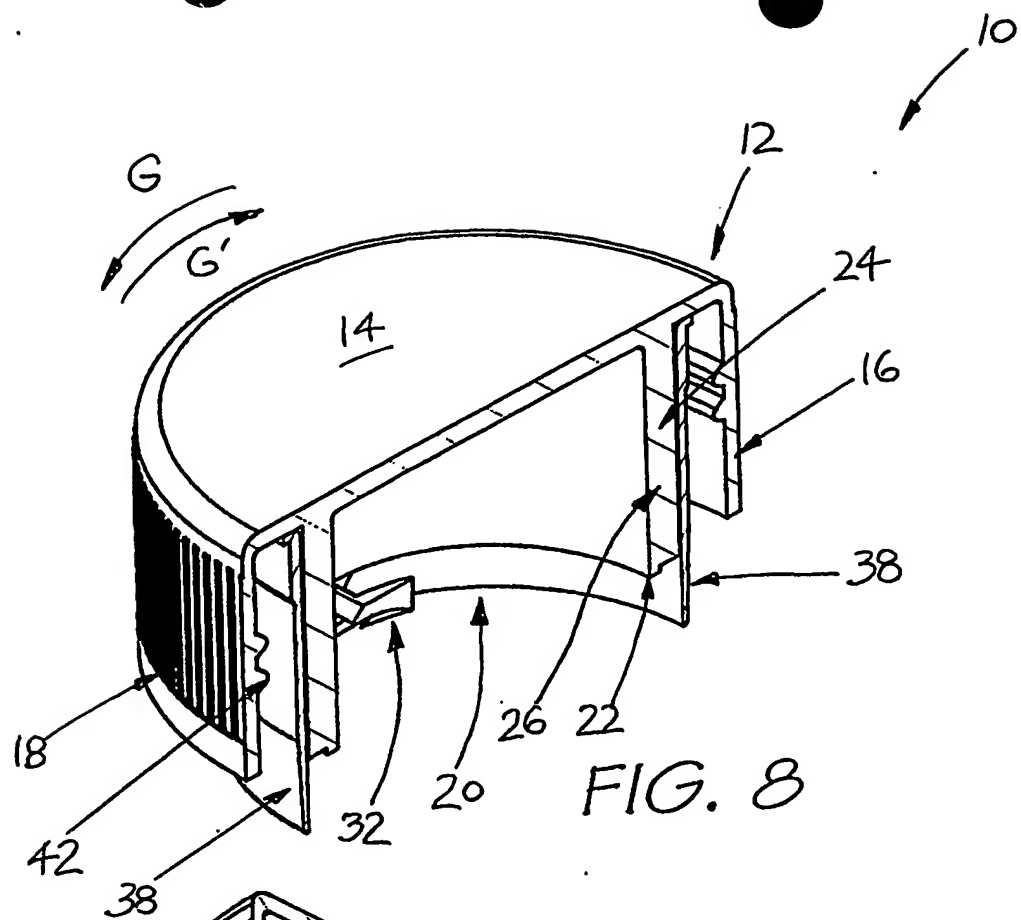


FIG. 8

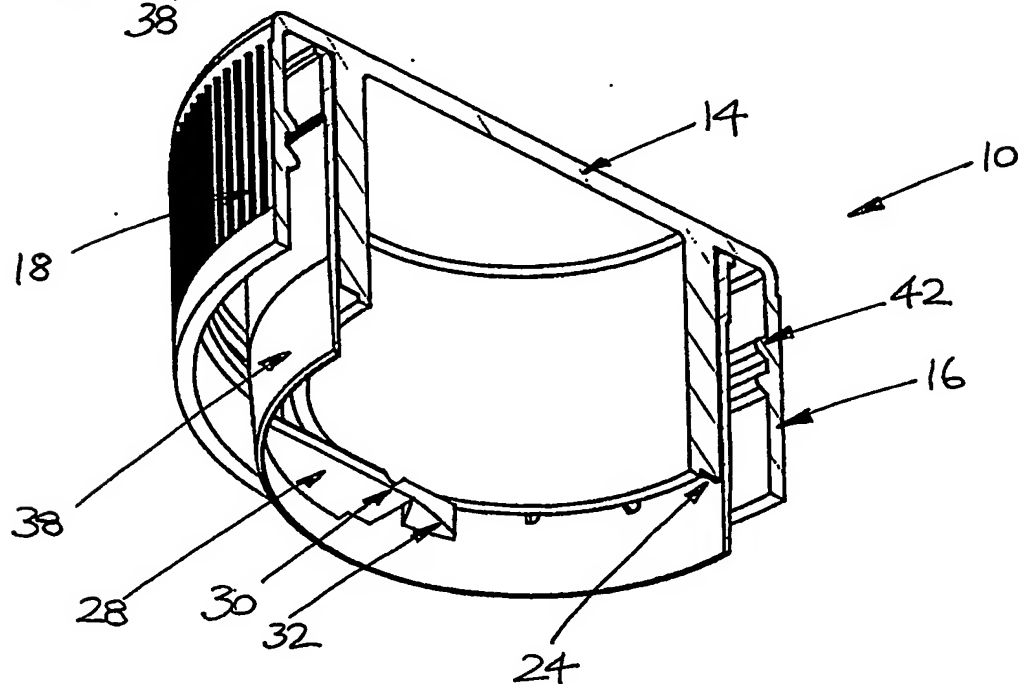
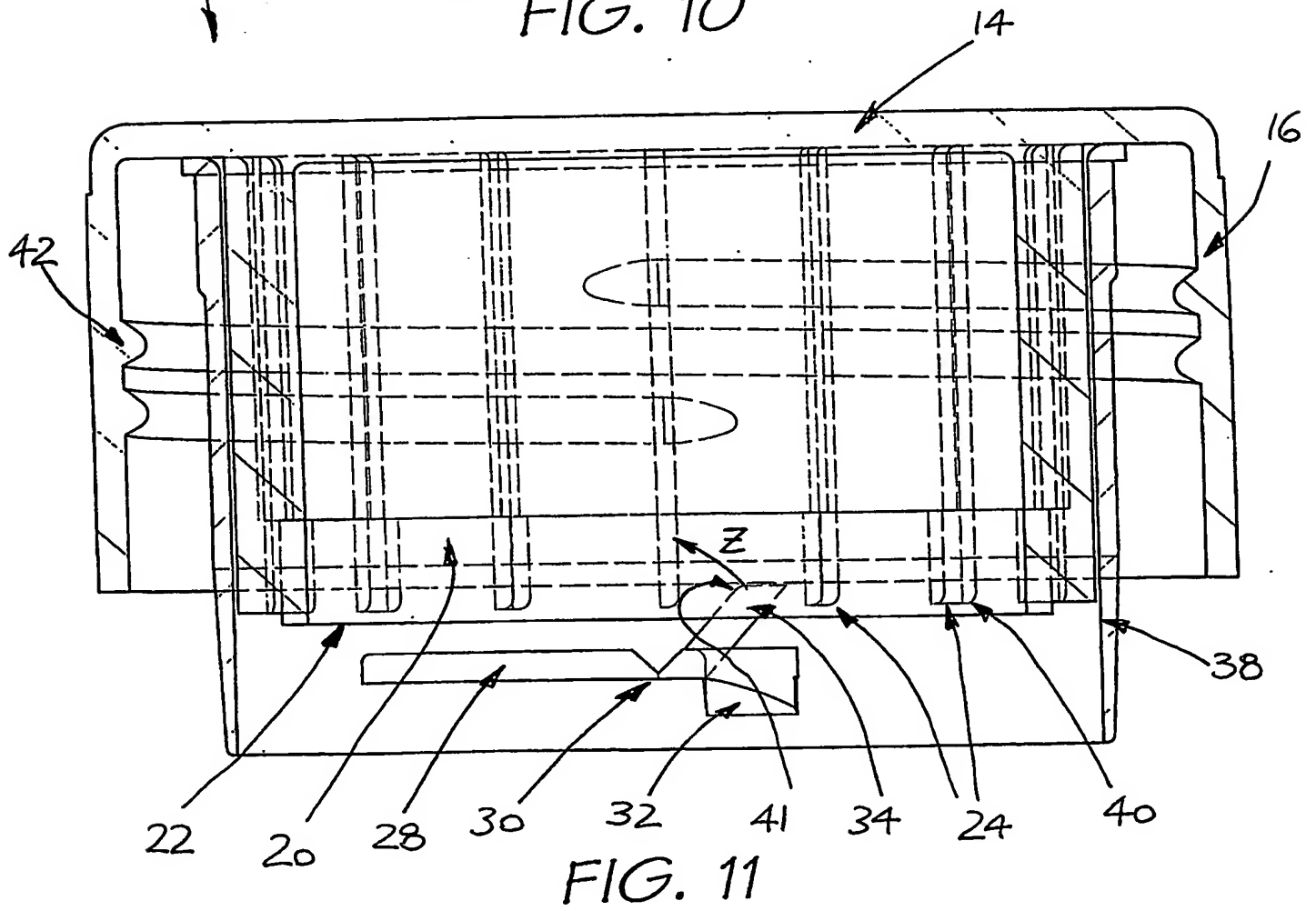
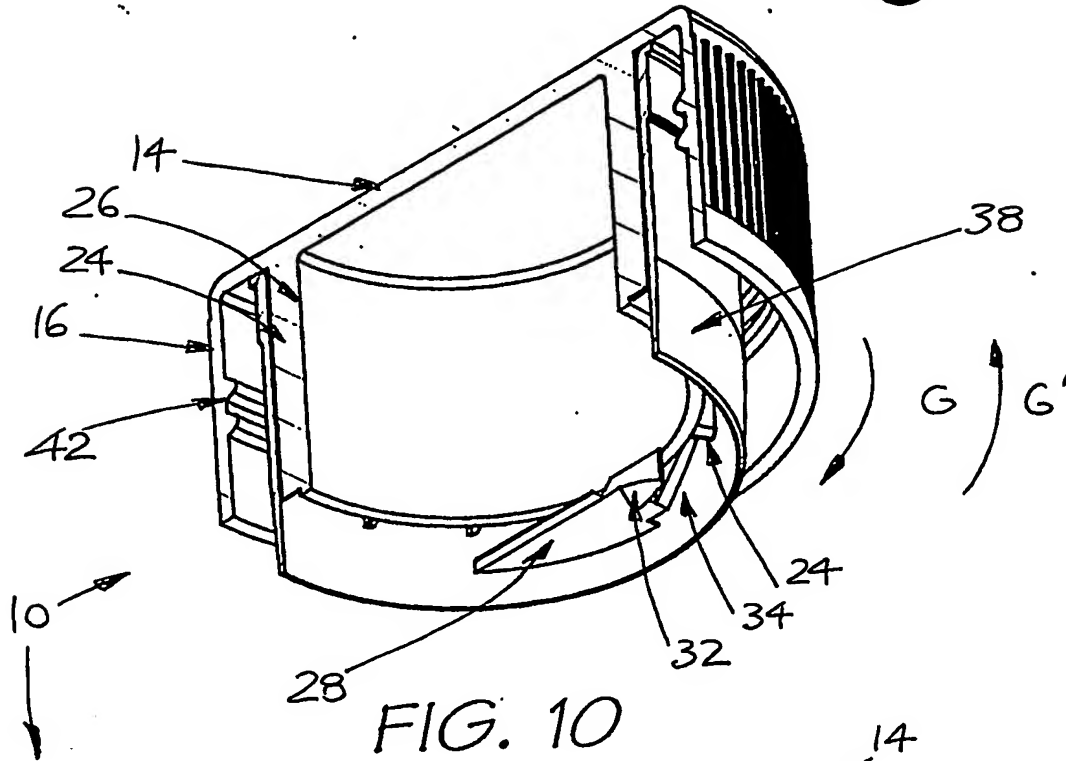


FIG. 9



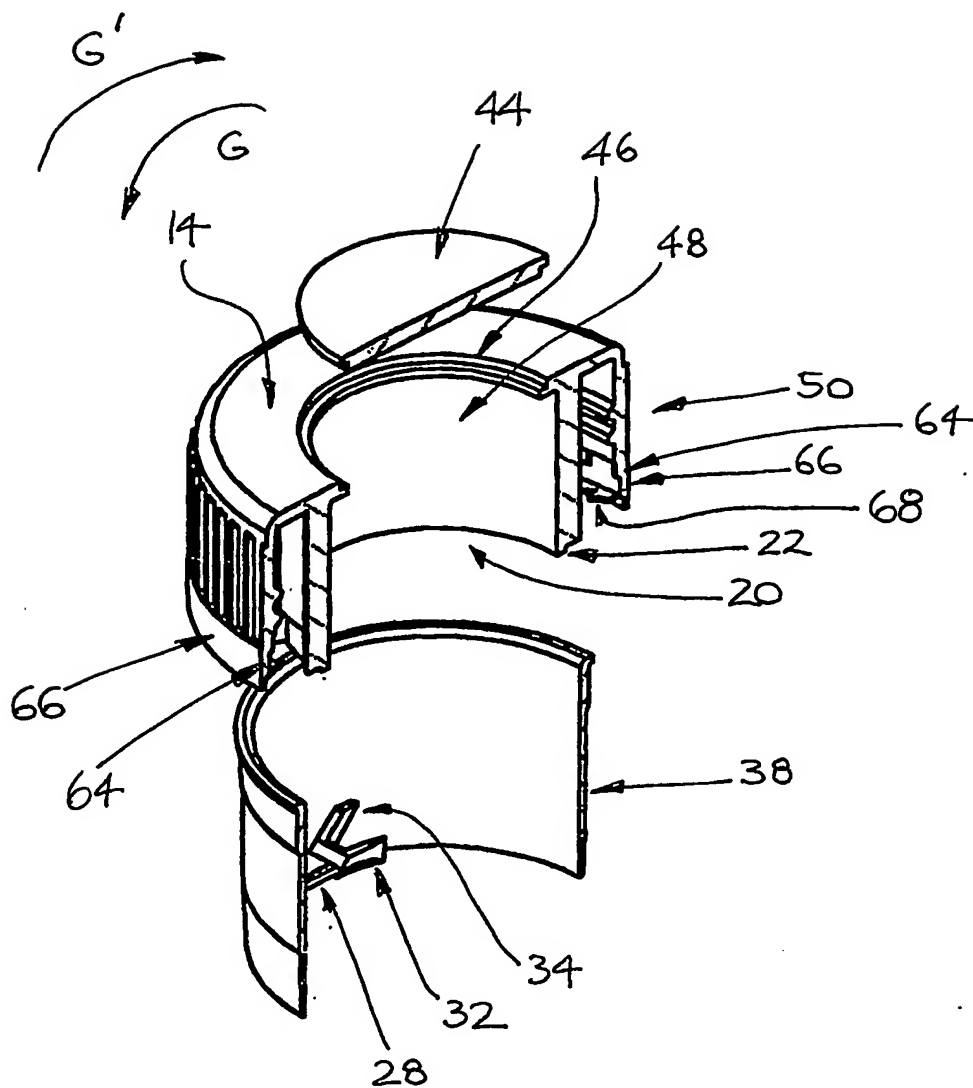


FIG.12

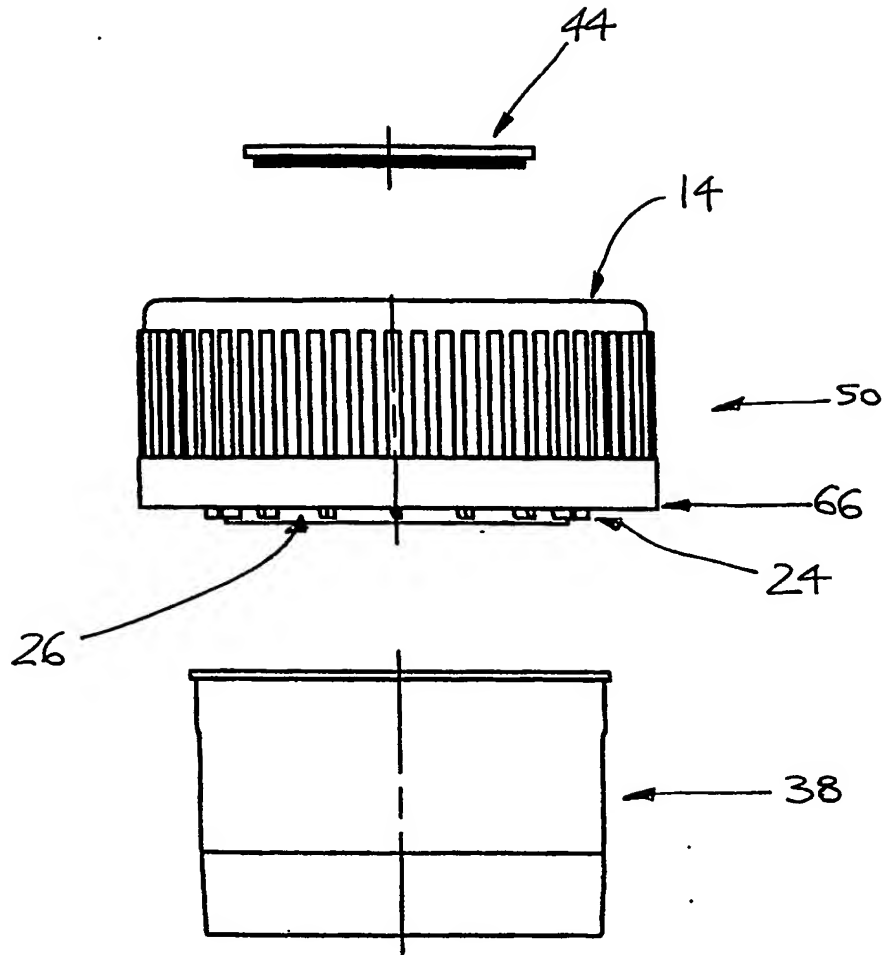


FIG.13

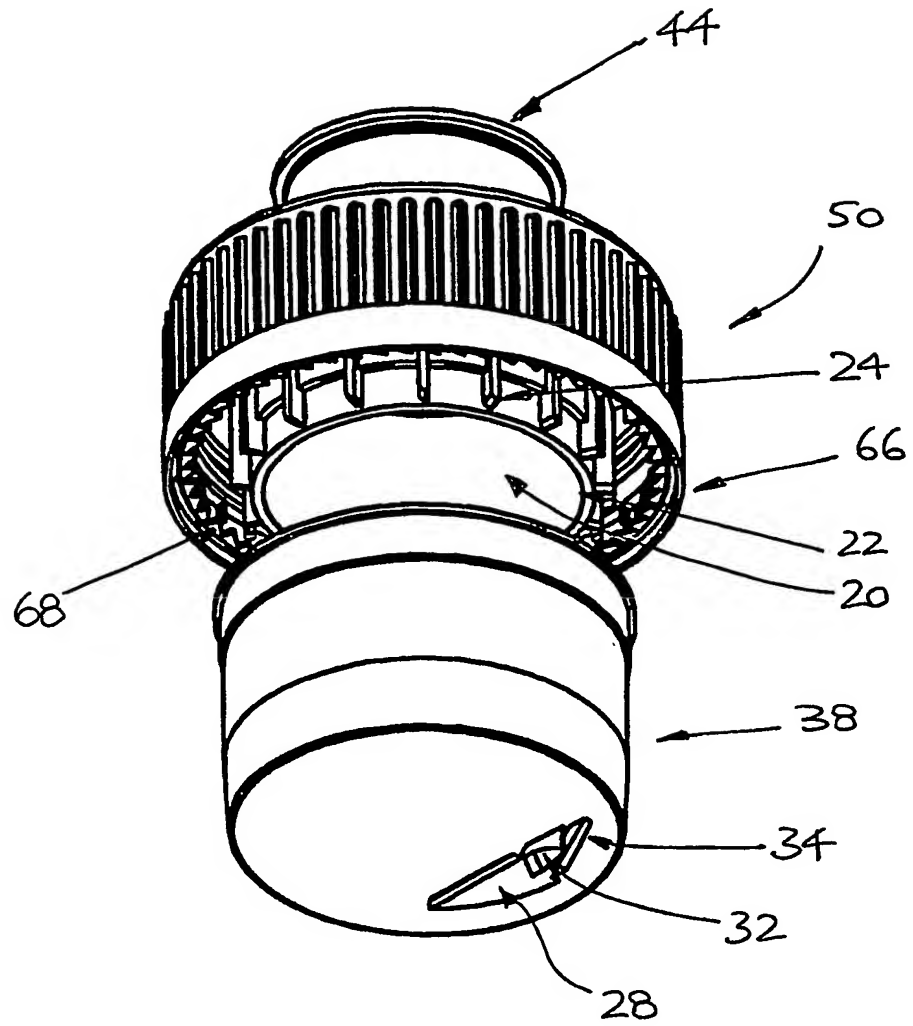


FIG. 14

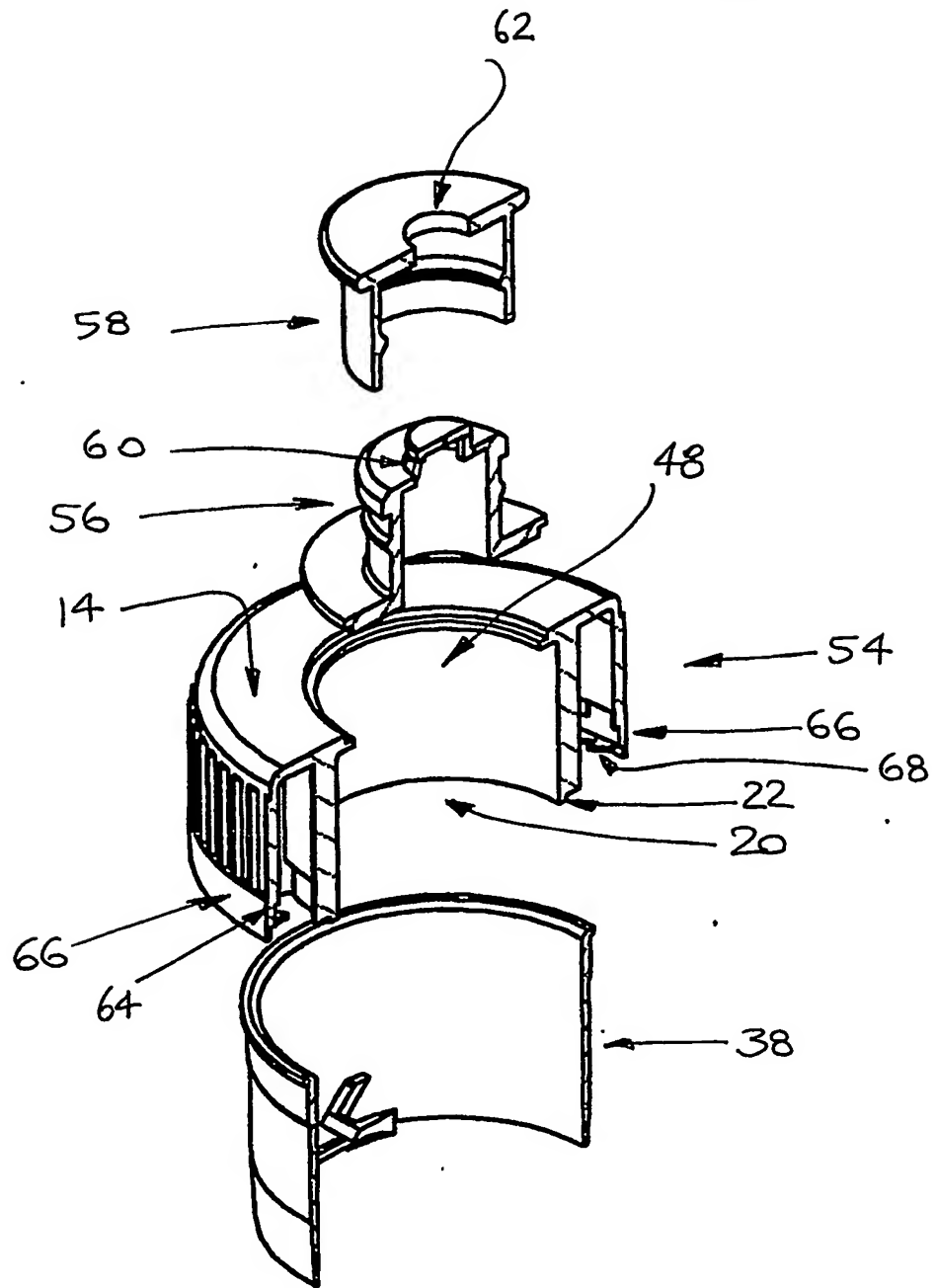


FIG.15

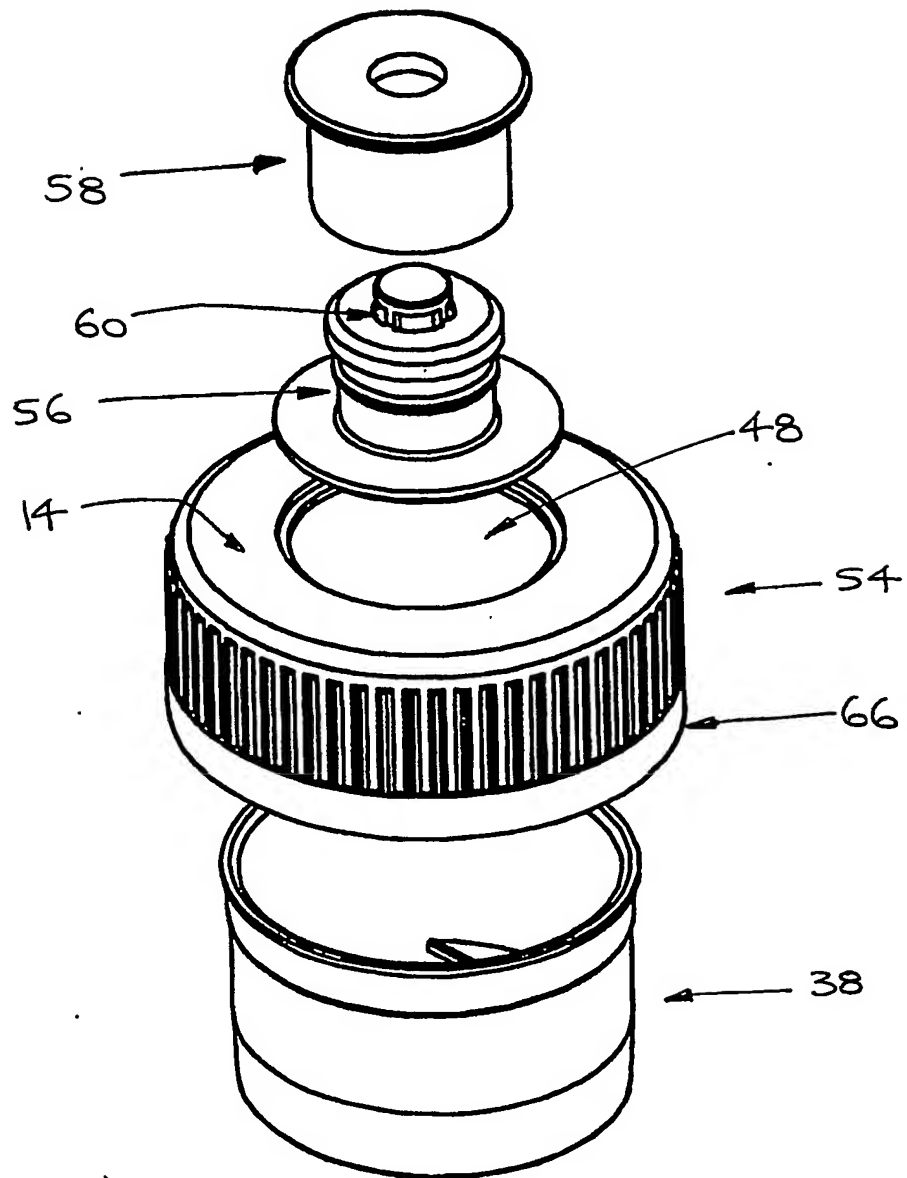


FIG.16

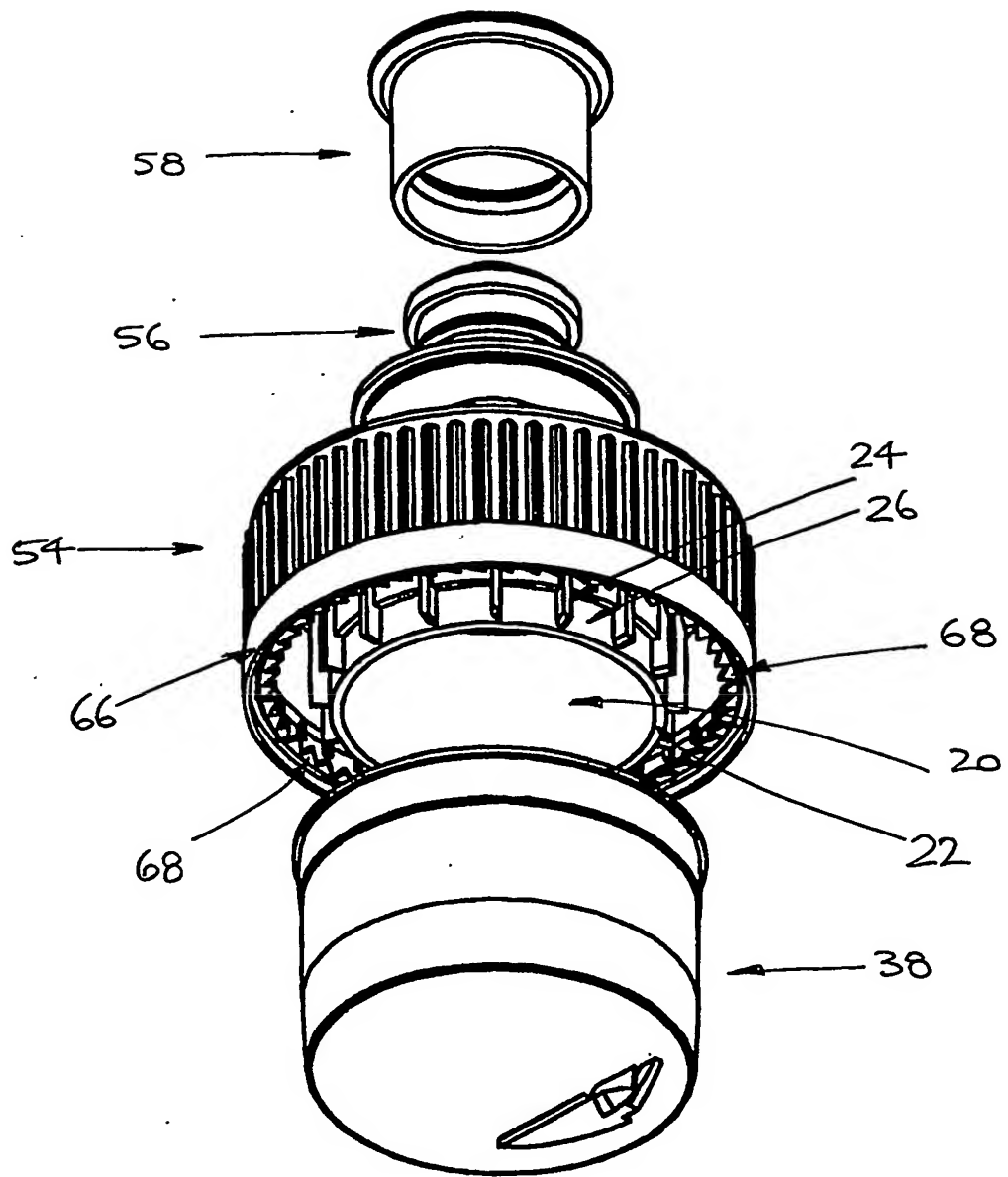


FIG.17